DOCUMENT RESUME

ED 308 650 EC 220 514

AUTHOR Gall, Robert S.; Hill, W. Leigh
TITLE Some Developments in the Uses of Technology in Special Education in Alberta: A Brief Overview.
PUB DATE 12 Dec 88
NOTE 13p.; Paper presented at the Council for Exceptional Children/Technology and Media Division Conference on Special Education and Technology (Reno, NV, December 11-13, 1988).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Agency Cooperation; *Disabilities; Distance Education; *Educational History; *Educational Technology; Foreign Countries; Program Development; Special Education; *Telecommunications
IDENTIFIERS *Alberta

ABSTRACT

The document describes efforts begun by the Canadian province of Alberta to apply telecommunications technology on a broad basis in special education, through the involvement of provincial and local agencies and public and private sectors. A brief history of the development of Alberta's educational technology over the past two decades is offered. The Distance Learning Project and the establishment of the Alberta Education Response Centre (ERC), which disseminates information; conducts professional and paraprofessional training, research, and demonstrations; and develops learning resources are particularly noted. Programs of the ERC include Response Line Services and the Alberta Special Education Network. Challenges for the future include the lack of hardware and software in the field, the necessity of raising the awareness level of local special educators, assembly and maintenance of Alberta-specific information, the changing policy context, and the rapid rate of technological change. (JDD)

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SOME DEVELOPMENTS

IN

THE USES OF TECHNOLOGY IN SPECIAL EDUCATION

IN ALBERTA: A BRIEF OVERVIEW

A Paper Prepared for the
CEC/TAM Conference
"A Winning Combination"

Reno, Nevada

Robert S. Gall, Professor of Education
University of Lethbridge (Alberta, Canada)

W. Leigh Hill, Project Manager,
Technology and Network Services
Education Response Centre
(Edmonton, Alberta, Canada)

December 12, 1988

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USES OF TECHNOLOGY IN SPECIAL EDUCATION: THE EXAMPLE OF THE CANADIAN PROVINCE OF ALBERTA: A BRIEF OVERVIEW

A. BACKGROUND

Alberta is a western Canadian province of large land area and - in global terms - small population - an area of over 255,000 square miles including today a population of 2.6 million. Total school enrolment numbers 430,000, distributed across 150+ school districts; of that number over 40% are enrolled in schools of less than 125 students. The "special needs" student population - gifted and talented, sensory and physically impaired, and the learning disabled, approximate 40,000, again, distributed widely throughout the province.

The power and potential of technology to enhance teaching and learning throughout Alberta has generally been acknowledged, and the province has been recognized to date as a national leader in the introduction and uses of technology to improve education. Only recently, however, have concerted efforts begun, especially related to special education, to apply telecommunications technology on a broad basis, involving provincial and local agencies, and the public and private sectors, and to dedicate significant amounts of resources to a host of new initiatives. Even so, Alberta enjoys a history of successful development in educational technology over the course of the past two decades.

B. PRIOR TO 1987: A BRIEF HISTORY

The Computer Technology Project (CTP)

The provincial department of education established a special office in 1981 dedicated to promoting the use of micro-based technology for general education purposes in Alberta schools. With a mandate which included hardware acquisition, software licensing and evaluation, and information dissemination, the CTP succeeded over the next three years in helping schools across the province build one of the largest installed bases of microcomputers in North America (more than 25,000 microcomputers in 1500 schools; one-third of all schools with 10 or more microcomputers; two-thirds of all schools with designated "computer coordinators", and - according to the 1987 survey - with 12% of elementary teachers rated by their principals as "extensive computer users"). In addition, the CTP developed a new software evaluation process, generally considered to be more practical and "robust", in cooperation with agencies both north and south of the border, which is still in use in Alberta today (in spite of the Computer Technology Project's being wound down in 1984).

Alberta Educational Communications Corporation ("ACCESS" Alberta)

This agency, established in 1973, provides multi-media educational communications services to the province. Currently this involves satellite transmission (through transponders on the ANIK C3 Satellite)

to transmit adult education and live interactive programs (e.g. paramedics), the homework hotline, and the University of Athabasca carrier programs. Readers will be interested to learn that for several years now, the ACCESS Authority has provided grants of one thousand dollars (to a maximum of eighty per year) to local educational agencies and public non-profit agencies to enable them to purchase satellite dishes and associated equipment suitable to receive the ACCESS satellite signal in communities not served by appropriate cable services.

Project Othello (1985)

The longest-standing, multi-school system communications project in Alberta was Project Othello. Made possible through a sizeable equipment donation from IBM Canada, the project began three years ago as a joint venture with the University of Alberta (Faculty of Education). Computer labs were established in three schools - elementary, junior high and senior high - separated by more than 400 miles. These schools, in turn, were connected through dial-up lines, at 1200 bps, to the University's MTS messaging and VM (Profs) systems. The principal purpose of the project, of teaching students about the use of on-line systems, has been met. (While project coordinators had hoped for an extension for another 3 years, to allow for the inclusion of more schools and school systems, this prospect appears unlikely, given the emergence of other broadly-based telecom initiatives across the province.)

The Walter Dinsdale Center: DISC (Disability Information Services of Canada)

Begun in 1986 and located at the University of Calgary, DISC provides a nationwide carrier service to facilitate data communications throughout the Canadian disabled community. DISC promotes interaction between disabled Canadians and all those who interact with them in advocacy agencies, universities, and colleges, the service sector in all levels of government, and the private sector. 32 simultaneous users can employ a variety of telecommunications applications which operate on a VAX11/750 host computer. Direct computer access to DISC is possible through DATAPAC/TELENET using the address 63300483.

Developments at the University of Lethbridge

The University of Lethbridge "Rural Special Education Outreach Project" (RSEOP), a pilot project from 1982-88, had as its primary goal the provision of direct information support to rural special educators at all levels in Southwestern Alberta. A microcomputer-based Bulletin Board and E-Mail system, entitled the PRAIRIE POST, was organized to enable university personnel to facilitate communication between and among all sectors of the Special Education community.

The Prairie Post Bulletin Board System was based on a 64K Apple microcomputer supported by a 20 megabyte hard drive, A300/1200 BAUD MODEM, a superserial card and clock card. Each remote site utilized a variety of microcomputers configured with 300/1200 baud modems and the appropriate telecommunications software package. A brokerage system was initiated to allow cost-efficient indirect access to external electronic information sources such as SPECIALNET and COMPUSERVE.

PRAIRIE POST was widely demonstrated outside of the province, and its simple implementation design appealed to other telecommunications applications such as that developed by the Disabled Children's Computer Group (DCCG) at Berkeley, California. (Readers will recognize that the DCCG is the primary model program sponsored by Apple Corporation's National Special Education Alliance.)

Developmental work on PRAIRIE POST had a direct impact on the later development of the ASPEN provincial network, described below. The University of Lethbridge, in conjunction with the Department of Education, offered an experimental course in late 1988 which was designed to provide an opportunity for teachers to gain experience in an electronic database environment. The course investigated the applications of educational telecommunications for integration into the school curriculum, use as a utility in organizing classroom resources, and use as an electronically-extended library.

C. 1987 AND BEYOND

The past two years has heralded the establishment of several very major developments in the uses of telecommunications technology right across Alberta.

Distance Learning Project

Launched in September, 1987, by Alberta Education in cooperation with Alberta Government Telephones (the provincial telephones utility) this project was geared to expanding educational opportunities for high school students in small, rural schools.

Such students were unable to access a rich curriculum menu earlier due to factors which plague all rural areas: low student enrolment and few teachers to address the wide range of abilities and interests those students present.

The project provided 74 provincially-approved correspondence courses otherwise unavailable to high school students: those who completed the courses achieved a 95% success rate. The plan involved connecting tutors and markers with students using facsimile machines and teleconferencing. Materials generated by the Alberta Correspondence School were the basic course content, and this was supplemented with tutors/markers who provided feedback, marked exams and lessons, and

answered queries from students. Facsimile machines and telephone teleconferencing were employed in the communication process.

Phase two of the project, which commenced September 1988, involves the use of VSAT technology, through the sponsorship of the Department of Communications (Government of Canada), Alberta Government Telephones, and ACCESS Alberta.

Effective September 1988, students in selected schools in northern Alberta as well, through the Distance Learning Project North have access to a large range of high school programs, including the original course loadings from the southern Alberta experiment, and a new emphasis on the mathematics area.

On October 28, 1988, the Minister of Education announced a $5.4 million grant for equity in education that will enable students in rural communities and remote areas throughout the province to take many of the same courses as students in urban centres. The $5.4 million will be used to redesign Alberta Correspondence School courses and to expand Alberta Education's distance learning initiatives into Northern Alberta.

New "learning packages" will be developed by the Alberta Correspondence School to replace traditional correspondence courses and to keep pace with changing educational requirements. Audio, video and computer software may augment the print-based packages, which are designed to accommodate individual learning styles.

When fully operational, both the Distance Learning in Small Schools and Distance Learning North Projects will involve over 40 schools and 2000 students.

D. ALBERTA EDUCATION RESPONSE CENTRE (ERC)
(DEPARTMENT OF EDUCATION OF THE GOVERNMENT OF ALBERTA)

Overview

Early in 1986, the Government of the Province of Alberta announced the establishment of the Education Response Centre. With two regional operating centres, one each in Alberta's major cities, and a provincial office entrusted with overall leadership and coordination, the Education Response Centre carries a far reaching special education mandate specifically directed to information dissemination and exchange, professional and paraprofessional training, research and demonstration, and learning resources development.

Major public commitments made at the time of the establishment of the Response Centres included the development and implementation of a province-wide, telephone-based information referral service and a province-wide computer-based communications and information network. In May, 1987, the newly-struck "Technology and Network Services" section of the ERC assumed direct responsibility for the design, development and

introduction of both the telephone-based "Response Line Services" and the computer-based "Alberta Special Education Network", "ASPEN". The significance of the establishment of the ERC was that, for the first time in the recent history of the province, the government was signalling its deliberate intent to foster rapid improvements in special educational services in particular, and education in general. This would be accomplished by actively promoting the use of appropriate existing and emerging telecommunications and micro-processing technologies across Alberta.

A significant part of the Education Response Centre mandate is to provide leadership to the field in the uses of telecommunications and micro-processing technology to improve special education province-wide. In keeping with this role, to the extent that resources allow, the ERC will provide financial sponsorship to local school systems who wish to install school system-wide bulletin board systems.

In 1987, the ERC provided funding to the County of Grande Prairie, in northwestern Alberta, for installation of a system-wide micro-computer bulletin board system dedicated to administrative and special education support. This installation was based on the PRAIRIE POST model. Similar projects in other Alberta school systems will occur in 1988-89.

ERC's "Response Line Services"

The "Response Line Services" is a telephone inquiry and information referral service providing zenith-access to parents, special educators and the general community. Modelled in part on the "Tech Tapes" service of the Council of Exceptional Children, the Response Line Services combines on-line operators with an extensive library of recorded voice messages on special education programs and services in Alberta, the nature of exceptionalities, and special topics. At the present time, the library contains some 70 messages. An additional 3 dozen are under development.

Two zenith numbers provide access to two, four-line rotaries: one four-line rotary provides direct access to the Response Line operators. The other four-line rotary allows direct access to the automated message library. The library is built around the multi-line disc system (Data Acquisition Services, San Marcos, California - a Stride 440 computer Motorola 68000 series) with a 68 megabyte Maxtor hard drive providing current digitized voice capacity of 300 minutes. Line access can be increased to a maximum 64 lines. For the present, the message library will be restricted to 4 lines until more experience has been gained regarding call volumes.

Full call conferencing and call transfer capability exists between the message library and the response line operators, for those callers requiring or wishing operator assistance or re-direction.

Messages included in the library can be amended, or deleted, or new messages added, on a direct, dial-in, remote basis by the Response Line Services supervisor. This enables the Education Response Centre and Alberta Education as a whole to add emergent messages with little or no lead time.

ERC's The Alberta Special Education Network ("ASPEN")

At the forefront of current developments in Alberta is ASPEN - the Alberta Special Education Network. Launched in April, 1988, as a province-wide, toll-free, dial-up facility operated by the Education Response Centres, ASPEN provides special education classroom teachers, local school systems, central office specialists, parents and other professionals who work with exceptional children on a regular basis, with micro-computer access from anywhere in the province.

ASPEN features include a private mail service, weekly new services focussing on special education in Alberta, bulletin boards and public messaging, and an extensive reference library. This features information (much of it Alberta-specific) on school programs, special community resources, professional services, and hardware/software/ adaptive peripheral devices. Network improvement plans for 1988-89 include development of an enhanced real-time conferencing capability. (As well, the ERC has made the considerable capacities of ASPEN directly available to the Distance Education in Small Schools Project.)

Originally, ASPEN designers envisioned that the system would have the capacity to modify the "look and feel" of the user interface to cater to the unique needs of individual users. For example, an individual with physical or visual handicaps may appreciate the ability to simplify and re-orient screens or to send sound prompts down-line. This important feature will be added in the near future.

The Alberta Special Education Network (ASPEN) is based on a Compaq 386 model 20 microcomputer with 4 megabytes of ram and a 130 megabytes hard drive. The PC-MOS/386 operating system allows for up to eight concurrent users, running as separate tasks.

Dial-up access is provided through the Tele Information Network of Alberta (TINA), a non-packet switched data network operated by Alberta Government Telephones, which allows for reverse billing to the Education Response Centre at significantly reduced rates.

A single province-wide TINA number ("1-880") ends in an 8 line rotary and connects to the server through 8, rack-mounted Develcon mainframe-quality high speed modems and a Connect Tech Intellicon smart serial interface device.

Use of the PC-MOS operating system allows for the use of well-behaved DOS programs for specialized on-line applications. To illustrate, Infosift, the search engine from AskSam (Seaside software, Florida), allows ready keyword searching within ASPEN's reference library.

ASPEN requires VT100 terminal emulation and is geared to communications at 1200 bps, although communications at lower speeds is possible.

E. CHALLENGES FOR THE FUTURE

Clearly, with Response Line Services and ASPEN, the Education Response Centre is on the leading edge of developments in Alberta related to the appropriate uses of telecommunications and micro-processing technology. Yet, there are a number of challenges which will have to be grappled with over the coming months in order to ensure long term survival and success.

Lack of Hardware and Software in the Field

In spite of the fact that it has one of North America's largest installed bases of microcomputers (primarily Apple-based) Alberta has very few schools with modems or appropriate communications software. In fact a recent survey conducted by Alberta Education noted that only about 7% of Alberta's 1600 schools owned modems. Clearly, in terms of access to and effective use of any computer communications and information facility in Alberta, this is a major issue.

The Education Response Centre is in the process of negotiating with private industry to arrange for a donation of significant numbers of modems to Alberta school systems. A bulk purchase of Apple-compatible VT100 communications software, to go along with a number of MS-DOS compatible shareware communications products already available, has been completed.

Raising the Awareness Level of Local Special Educators

Given the lack of modems and software in the field to this time, it is not surprising that, by and large, many local special educators remain unaware of existing on-line services. Consequently, many lack an appreciation for the power and potential of existing telecommunications and micro-processing technology for quality improvement in education.

A top priority for the Education Response Centre in 1988-89 is raising this awareness level through the sponsorship of a series of training programs for parents and special educators. An aggressive marketing and public information program, related specifically to the Alberta Special Education Network, will be launched. The expectation is that focussing on ASPEN will have the added advantage of raising the overall general awareness level among educators as a whole, serving as a "platform" for fostering active exploration of the instructional potential of telecommunications and micro-processing technologies.

The Assembly and Maintenance of Alberta-Specific Information

At the present time, virtually no information exists in consolidated, readily accessible fashion regarding current programs and practices in special education across Alberta.

A key to the success of the ASPEN initiative will be the extent to which the network provides timely information of practical value to classroom teachers and other school based personnel - who's doing what across the province, with what effect and in what circumstance.

A major priority for the Education Response Centre will be the identification, assembly and provision of this kind of information through the on-line REFERENCE LIBRARY of ASPEN. It will be this information, Alberta-specific, which will distinguish ASPEN from other similar existing on-line services in North America

The Changing Policy Context

The provincial department of education has signalled its deliberate intent to adopt an aggressive leadership role in the uses of technology to improve the quality of education province-wide.

More new initiatives have been launched in this area recently than at any other time in the history of the province.

It is critical that new mechanisms be developed to guarantee the effective coordination and articulation of all these initiatives, as well as to ensure the necessary, direct and active involvement of universities, local school systems, referent groups, the private sector and the parent and general communities.

This is especially crucial at this time, when competition for continuingly scarce public financial resources is increasing markedly.

The Rapid Rate of Technological Change

Policy makers and decision makers, provincial and local alike, cannot afford to wait until the "ultimate" technological solution is at hand. There is a social and moral imperative to act today to improve the educational lot of all school aged youngsters in Alberta, particularly those with exceptional needs. This means that choices regarding the most "appropriate" technology will have to be made in the full knowledge that more effective technologies are likely to be available in the near future. Necessarily implied is an acknowledgment that in many cases today's scarce resources will be committed to approaches which, in the long term, may prove to be less than fully cost-effective and educationally sound.

F. CONCLUSION

As Goble (1982) stated:

> "We are having thrust upon us the most significant new instrument since the invention of print, and one that presents us with a similar challenge - to learn to use it, to learn to live at ease and with confidence in a world based on its exploitation, to distinguish between its uses and those which are frivolous distractions, to respond with discernment, to recognize the moment when it signals the involvement of our interests, and to defend ourselves against its misuse."

As the above quotation suggests, we are at the threshold of a new era in the delivery of education information. It is to be repeated that technology makes many innovations feasible, but sincere and widespread communication between all affected sectors of society must occur if this is to be translated in long-term success.

ASPEN and the RESPONSE LINE, as examples of technologically-supported forms of distance information delivery may serve to supplement and support the traditional instructional activities throughout the province.

They may, if expanded, replace (in all or in part) the traditional curriculum delivery system where that system is not functional and of benefit to the individuals intended for service.

They can serve to expand the quality of independence enjoyed by recipients by allowing home and school-based access to rich outside resources. Finally, they may encourage the exploration and development of innovative instructional strategies by allowing educators at all levels to communicate more effectively with each other and with the resources employed by the private sector.

It is important to note that the provincial department of education has become engaged in high-level discussion directed to the prospects and potential of satellite communications and land-based systems. Within the next few months a unified policy perspective on technology and education in Alberta will be released. This new policy perspective will provide the much-needed context wherein the Government of Alberta can spur the exploration of technology to improve the quality of education province-wide.

Recent economic stabilization in Alberta has spurred a renewal of interest among private industry, Alberta telecom companies and the larger education community in working with the provincial department of education to achieve this objective.

To the extent that the AERC project is able to effectively implement its plans in the immediate future, the province of Alberta will demonstrate international leadership in this innovative field.

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Note:

Readers outside of the province of Alberta may wish to access ASPEN. The data line is located at 403-438-4787. The following communications handshake parameters must be used: 8 data bits, NO parity, and 1 stop bit (N,8,1) 300 or 1200 baud; VT-100/102/220/ANSI.

ASPEN administrators, Matthew Anthony and Leigh Hill, can be reached in person by calling 403-422-6326.